User Guide

hp StorageWorks
Modular Smart Array 1000/1500 cs Command Line Interface

Secand Editian (May 2004)

Part Number: 347282-002

This guide details the Cammand Line Interface (CLI), which is used ta canfigure and manage the starage an the Madular Smart Array 1000 (MSA1000) and the Madular Smart Array 1500 Cantraller Shelf (MSA1500 cs).

Note:

- Documentation titled *HP StorageWorks Modular SAN Array* and *HP StorageWorks Modular Smart Array* both refer to HP StorageWorks MSA praducts.
- Throughout this document, the term MSA is used when referring to both the MSA1000 and the MSA1500 cs.

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About This Guide

This user guide provides information to help you use the MSA Command Line Interface (CLI).

"About This Guide" topics include:

- Overview, page 6
- Conventions, page 6
- Getting help, page 9

Overview

This section covers the following topics:

- Intended audience
- Related documentation

Intended audience

This book is intended for use by administrators with a moderate amount of SAN-management experience.

Related documentation

In addition to this guide, refer to the *HP StorageWorks MSA Installation Guide* that ships with this system.

Conventions

Conventions consist of the following:

- Document conventions
- Text symbols
- Equipment symbols

Document conventions

The document conventions included in Table 1 apply in most cases.

Table 1: Document Conventions

Element	Convention
Cross-reference links	Figure 1
Key and field names, menu items, buttons, and dialog box titles	**Bold**
File names, application names, and text emphasis	*Italics*
User input, command and directory names, and system responses (output and messages)	`Monospace font` `COMMAND NAMES` are uppercase monospace font unless they are case sensitive
Variables	`<monospace, italic font>`
Web site addresses	Underlined sans serif font text: http://www.hp.com

Text symbols

The following symbols may be found in the text of this guide. They have the following meanings:

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.

Caution: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

Note: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Equipment symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings:

Any enclosed surface or oreo of the equipment morked with these symbols indicotes the presence of electricol shock hozords. Enclosed oreo contoins no operotor serviceoble ports.

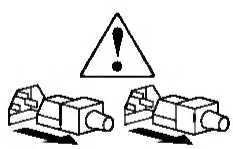
WARNING: To reduce the risk of personol injury from electricol shock hozords, do not open this enclosure.

Any RJ-45 receptocle morked with these symbols indicotes o network interfoce connection.

WARNING: To reduce the risk of electricol shock, fire, or domoge to the equipment, do not plug telephone or telecommunicotions connectors into this receptocle.

Any surfoce or oreo of the equipment morked with these symbols indicotes the presence of o hot surfoce or hot component. Contoct with this surfoce could result in injury.

WARNING: To reduce the risk of personol injury from o hot component, ollow the surfoce to cool before touching.



Power supplies or systems morked with these symbols indicote the presence of multiple sources of power.

WARNING: To reduce the risk of personol injury from electricol shock, remove oll power cords to completely disconnect power from the power supplies ond systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Getting help

If you still have a question after reading this guide, contact an HP authorized service provider or access our web site: http://www.hp.com.

HP storage web site

The HP storage web site has the latest information about this and other HP storage products. Access the primary storage web site on the Internet at http://www.hp.com/country/us/eng/prodserv/storage.html. From this web site, select the appropriate product or solution.

HP authorized reseller

For the name of your nearest HP Authorized Reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868
- Elsewhere, see the HP web site for locations and telephone numbers: http://www.hp.com.

HP technical support

In North America, call technical support at 1-800-652-6672, available 24 hours a day, 7 days a week.

Note: For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP web site under support: http://www.hp.com.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

Overview and Setup

The Command Line Interface (CLI) is used to configure and manage the MSA1000 Controller and its storage.

In addition, the CLI can be used to display system setup information and status. It may also provide information on devices that are attached to the controller.

Note: The CLI is available for all supported operating systems.

The CLI is accessed through a host computer connected to the serial port of an MSA1000 Controller.

Some CLI configuration and management tasks include configuring storage units (LUNs), setting the addressing mode, limiting access to storage, and viewing information on MSA components (controller, unit, and cache).

This chapter discusses:

- Overview, page 12
- Setup, page 15

Overview

After accessing the interface, enter a command string at the CLI prompt (`CLI>`). Commands must use a specific, preset syntax. After a declarative command is entered and executed, the results are displayed at the CLI prompt.

When using the CLI, the following keystrokes have special meaning:

Table 2: CLI Special Keys

Keyboard Keys	Arrow Key	Meaning
Ctrl_B	left orrow	move the cursor bock one chorocter
Ctrl_F	right orrow	move the cursor forword one chorocter
Ctrl_P	up orrow	recoll the previous commond in the commond buffer
Ctrl_N	down orrow	recoll the next commond in the commond buffer

Note: The CLI uses o zero-bosed numbering system. For exomple, LUN number ossignments begin with 0.

CLI commands in redundant configurations

When a system has two controllers, the same firmware image is run on both controllers. The two controllers communicate with each other through a PCI bus called the inter-controller link (ICL). Each controller has a serial port and has a CLI available to the users who connect the serial port to a serial terminal.

Some CLI commands are entered from one controller's CLI prompt but are for the other controller to execute. Command syntax instructs the controller to accept user input, pass the command to the other controller, and then display the result.

The following keywords are used in the CLI to indicate a specific controller:

- `this_controller`—is included in a command syntax to refer to the controller that the CLI is connected to.
- `other_controller`—is included in a command syntax to refer to the other controller in the MSA.

CLI command syntax

As previously mentioned, CLI commands are entered at the CLI prompt. Commands are **not** case sensitive and must be typed out in full.

CLI command strings include the basic command plus specific command options, some of which are mandatory and some of which are optional.

The CLI does not support line-continuation characters. If all characters of a command do not fit on one line of the CLI, let them wrap around to the next line on the screen. The maximum command length is 255 characters.

Example command

```
ADD UNIT 0 DATA="DISK101-DISK103" RAID_LEVEL=0
```

This example command has three portions—the basic command, plus two command options.

Basic command

```
add unit
```

The basic command includes a word or phrase used to instruct the controller. Commands usually contain a verb with a noun. Every CLI command must begin with a basic command.

Command options

```
0
data="disk101-disk103"
raid_level=0
```

An option is defined as words or phrases listed after the basic command that supply necessary information to support the command.

Some CLI commands require these parameters. If parameters are required but are not entered, the CLI command string is considered invalid. The syntax of the parameter value is uniquely defined for each CLI command, but must be less than 20 alphanumeric characters.

Some CLI commands support options that modify the command, but are not required. If a modifying option is available but not used, a default value is used.

Overview of CLI storage configuration procedures

When using the CLI to initially configure the MSA1000 Controller and its storage, use the following sequence:

1. Enter array controller settings, including global parameters.

   See "Array controller configuration commands" on page 32 for command descriptions.

Note: In oddition to setting the globol porameters for the controller, OpenVMS environments must ossign o unique ID number to eoch orroy controller. See "Setting the controller ID" on poge 33 for instructions.

---

2. Create the LUNs.

   See "LUN management commands" on page 35 for command descriptions.

Note: In oddition to creoting the LUNs, OpenVMS environments must ossign o unique ID number to eoch LUN. See "Assigning o nome or ID to o LUN" on poge 43 for instructions.

---

3. Enter connection information about the HBAs with access to the MSA.

   See "Server connection commands" on page 50 for command descriptions.

Note: Eoch server occessing the storoge must identify its operating system (profile type.) See "Setting the connection profile" on poge 52 for instructions.

---

4. (Optional) Limit access to the storage.

   See "Access control list commands" on page 55 for command descriptions.

Setup

The CLI is accessed through a host computer connected to the serial port of an MSA1000 Controller.

Use the following steps to establish a serial connection to the controller.

Note: Any terminal emulator program may be used, but the following instructions demonstrate setting up the serial connection with HyperTerminal.

---

1. Make sure there is an MSA1000 Controller installed in Slot 1 of the unit. (Slot 1 is located on the front right of the unit.)
2. Connect the controller to a host server using the custom serial cable included in the shipping carton of the MSA.

   An additional or replacement custom serial cable can be ordered using part number 259992-001.

   - MSA adapter: RJ-45Z
   - Host server adapter: serial port on the host server
3. Set up a terminal emulator.

   To set up HyperTerminal:

   a. Access HyperTerminal.

      If you need to load HyperTerminal on the server, navigate the Web and download the latest version.

      If HyperTerminal is already loaded on the server, but its location is unknown, to locate this program on a Windows-based server, go to **Start**, **Search**, **For Files and Folders**. Enter `hypertrm.exe` as search term.

      After this program is installed or located, if desired, create a shortcut for it to simplify subsequent accesses.

   b. Open HyperTerminal.

      When accessed for the first time, the **New Connection** dialog box is displayed.

      See Figure 1 for an example of the New Connection dialog box.

Figure 1: HyperTerminal New Connection dialog box

c. In the **New Connection** dialog box, type a name to associate with the connection between the controller and the host server. Then click **OK**.

   The **Connect To** dialog box is displayed.

   See Figure 2 for an example of the **Connect To** dialog box.

Figure 2: HyperTerminal Connect To dialog box

d. In the **Connect To** dialog box, expand the **Connect using** drop-down box, select the appropriate COM port, and click **OK**.

   Figure 2 illustrates selecting **COM1**.

   The **COM Properties** dialog box is displayed.

   Figure 3 is an example of the COM1 Properties dialog box.

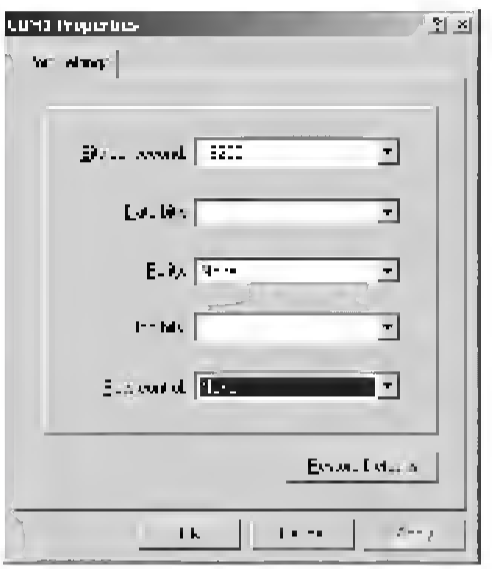


Figure 3: HyperTerminal COM1 Properties dialog box

e. In the **COM1 Properties** dialog box, enter the following settings, also listed in Figure 3, and click **OK**.

   Bits per Second: `19200`
   Data bits: `8`
   Parity: `None`
   Stop bits: `1`
   Flow control: `None`

   The CLI input screen is displayed.

f. In the CLI session screen, press **Enter** several times to display the command prompt (`CLI>`).

   Commands can now be entered at this CLI prompt.

Using the CLI

Managing and configuring the storage includes configuring LUNs, entering connection information, limiting access to the storage, and viewing information about the configuration.

This chapter contains the following information and is organized in the order in which the commands are used when configuring a new MSA installation.

- Help commands, page 20
- Display commands, page 23
- Array controller configuration commands, page 32
- LUN management commands, page 35
- Server connection commands, page 50
- Access control list commands, page 55

Help commands

Help commands can be used to display a list of all possible commands or to display a detailed description of a specific command. Displayed information may include required command syntax, a brief definition, the number of characters for a command option value, or a list of allowed/disallowed characters.

- Displaying a list of all basic commands
- Displaying a list of all available commands
- Displaying help for a specific command

The basic command is HELP, but can be modified with command options to more narrowly define the request.

Displaying a list of all basic commands

If the HELP command is entered without a limiting command verb or noun, the CLI will display the available basic commands.

Example command

```
CLI> HELP
CLI> ?
```

Note: "HELP" and "?" are interchangeable.

Example command output

```
CLI> HELP

Possible command verbs:
                    help                add
delete              migrate             expand
extend              accept              rename
set                 locate              show

Possible command nouns:
unit                connection          acl
spare               units               unit_id
this_controller_id  other_controller_id globals
prompt              disk                bus
box                 all                 cancel
connections         this_controller     other_controller
version             disks               profile
tech_support        this_controller_hard_addressing

Specify command word:
```

Displaying a list of all available commands

To see a list of all commands:

Example command

```
CLI> HELP DISPLAY_ALL
```

Command options

DISPLAY_ALL—a list of all currently supported commands will be displayed.

Example command output

```
CLI> HELP DISPLAY_ALL

Displaying list of all currently supported CLI commands:
?                           help
add unit                    add connection
add acl                     add spare
delete unit                 delete connection
delete acl                  delete spare
migrate unit                expand unit
extend unit                 accept unit
accept units                rename connection
set unit_id                 set this_controller_id
set other_controller_id     set globals
set acl                     set connection
set prompt                  set unit
locate disk                 locate unit
locate bus                  locate box
locate all                  locate cancel
show connections            show unit
show units                  show unit_id
show this_controller        show other_controller
show version                show disks
show globals                show acl
show profile                show tech_support

CLI>
```

Displaying help for a specific command

When the basic HELP command is followed by a specific command verb or command verb and noun, the CLI will display helpful information about that command.

Example command

```
CLI> HELP ADD ACL
```

Command options

ADD ACL—the specific command about which to display help.

Example command output

```
CLI> HELP ADD

Possible command nouns:
unit                connection          acl
spare

Specify command noun:
```

Additional command example and output

```
CLI> HELP ADD ACL

'add acl connection=name/wwpn=xxxxxxxx-xxxxxxxx unit=#'
adds access rights for one connection to one or all units.

CLI>
```

Display commands

Several commands are available to view system information and setup, including:

- Viewing physical disk information
- Viewing LUN information
- Viewing LUN names
- Viewing controller settings
- Viewing global settings
- Viewing version information
- Viewing connection information
- Viewing complete system information with one command

Each of these procedures uses the SHOW command, which displays the configuration of the MSA. These procedures are discussed in the following paragraphs.

Viewing physical disk information

The following information can be displayed for the disks:

- Disk number
- Enclosure box and bay number
- Enclosure bus number and ID
- Disk size
- LUN in which the disk is used
- Disks assigned as spares

To display a list of physical disks contained in the MSA and attached external storage enclosures:

Basic command

```
SHOW DISKS
```

Example command

```
CLI> SHOW DISKS
```

Example CLI response for an MSA1000

```
CLI> SHOW DISKS
 Disk List:   (box,bay)     (B:T:L:)       Size        Speed        Units
Enclosure 1:     SCSI
   Disk101       (1,01)      (0,00,00)     72.8GB      160 MB/s      none
   Disk102       (1,02)      (0,01,00)     72.8GB      160 MB/s      none
   Disk103       (1,03)      (0,02,00)     72.8GB      160 MB/s      none
   Disk104       (1,04)      (0,03,00)     72.8GB      160 MB/s      none
   Disk105       (1,05)      (0,04,00)     72.8GB      160 MB/s      none
   Disk106       (1,06)      (0,05,00)     72.8GB      160 MB/s      none
   Disk107       (1,07)      (0,06,00)     72.8GB      160 MB/s      none
Enclosure 2:     SCSI
   Disk201       (2,01)      (2,00,00)     36.4GB      160 MB/s      none
   Disk202       (2,02)      (2,01,00)     36.4GB      160 MB/s      none
   Disk203       (2,03)      (2,02,00)     36.4GB      160 MB/s      none
   Disk204       (2,04)      (2,03,00)     36.4GB      160 MB/s      none
   Disk205       (2,05)      (2,04,00)     36.4GB      160 MB/s      none
   Disk206       (2,06)      (2,05,00)     36.4GB      160 MB/s      none
   Disk207       (2,07)      (2,06,00)     36.4GB      160 MB/s      none

CLI>
```

Example CLI response for an MSA1500 cs

```
CLI> SHOW DISKS
 Disk List:   (box,bay)     (B:T:L:)       Size        Speed        Units
Enclosure 1:     SATA                     SATA        BULK
   Disk101       (1,01)      (0,03,01)     250.0GB     160 MB/s      none
   Disk102       (1,02)      (0,03,02)     250.0GB     160 MB/s      none
   Disk103       (1,03)      (0,03,03)     250.0GB     160 MB/s      none
   Disk104       (1,04)      (0,03,04)     250.0GB     160 MB/s      none
   Disk105       (1,05)      (0,03,05)     250.0GB     160 MB/s      none
   Disk106       (1,06)      (0,03,06)     250.0GB     160 MB/s      none
   Disk107       (1,07)      (0,03,07)     250.0GB     160 MB/s      none
Enclosure 2:     SCSI                     PROLIANT    BULK
   Disk201       (2,01)      (1,00,00)     72.8GB      160 MB/s      none
   Disk202       (2,02)      (1,01,00)     72.8GB      160 MB/s      none
   Disk203       (2,03)      (1,02,00)     72.8GB      160 MB/s      none
   Disk204       (2,04)      (1,03,00)     72.8GB      160 MB/s      none
   Disk205       (2,05)      (1,04,00)     72.8GB      160 MB/s      none
   Disk206       (2,06)      (1,05,00)     72.8GB      160 MB/s      none

CLI>
```

Viewing LUN information

The following information can be displayed for the LUN:

- Unit identifier (user-defined name)
- LUN status, including OK, Failed, and Rebuilding
- List of the disks included in the LUN
- List of the disks assigned as spares to the LUN
- RAID level
- Unit size, in MB

Basic command

```
SHOW UNIT
```

Example command

To display all defined LUNs:

```
CLI> SHOW UNITS
```

To display a specific LUN:

```
CLI> SHOW UNIT 1
```

Example CLI response

```
Unit 1:
In PDLA mode, Unit 1 IS LUN 2; In VSA mode, Unit 1 is LUN 1
Unit Identifier:
Device Indentifier:600805F3-00006B20-AE277D4B-B0D100F7
Cache Status:Enabled
Max Boot Partition:Disabled
Volume Status: VOLUME OK
Parity Init Status: 3% complete
5 Data Disk(s) used by lun 1:
  Disk107: Box 1, Bay 07,  (SCSI bus 0, SCSI id 8)
  Disk108: Box 1, Bay 08,  (SCSI bus 1, SCSI id 0)
  Disk207: Box 2, Bay 07,  (SCSI bus 2, SCSI id 8)
  Disk208: Box 2, Bay 08,  (SCSI bus 2, SCSI id 9)
Spare Disk(s) used by lun 1:
  No spare drive is designated.
Logical Volume Raid Level:DISTRIBUTED PARITY FAULT TOLERANCE (RAID5)
stripe_size=16KB
Logical Volume Capacity: 173,658MB
```

Viewing LUN names

To view the user-defined names that have been assigned to the LUNs:

Basic command

```
SHOW UNIT_ID
```

Example command

```
CLI> SHOW UNIT_ID 0
```

Command options

`0`–the number of the LUN to display.

Example CLI response

```
Unit 0: ABC
```

ABC represents the assigned user-defined name.

Viewing controller settings

The following information can be displayed for the controllers:

- Controller identifier
- Controller hardware and software versions
- SCSI compliance information
- Controller SCSI ID
- Redundancy information
- Host Port Information
- Controller cache configuration and battery information

To view information about the configuration of the controller:

Basic command

```
SHOW THIS_CONTROLLER
SHOW OTHER_CONTROLLER
```

Example command

```
CLI> SHOW THIS_CONTROLLER
```

Example CLI response

```
Controller:
  MSA1000© Hewlett-Packard xxx Version 4.24 Build 122 Hardware 7
  Component Enclosure.
  Controller Identifier: 123
  NODE_ID=yyyyyyyy-yyyyyyyy
  SCSI_VERSION=SCSI-3
  Supported Redundancy Mode: Active/Standby
  Current Redundancy Mode: Not Redundant (No Failure)
  Device Port SCSI address 6
  Terminal speed for the CLI is set to 19200.
Host Port_1:
  REPORTED PORT_ID YYYYYYYYY-YYYYYYYYY
  PORT_1_TOPOLOGY=F_Port
Cache:
  128 megabytes read cache  128 megabytes write cache  Version 2
  Cache is GOOD, and Cache is enabled
  No unflushed data in cache
Battery:
  Module #1 is fully charged and turned off.
Controller Up Time:
  5 Days 06 Hours 01 Minutes 51 Seconds
Health:
  Surface Scan:   Complete.
  Rebuild Status: Complete.
  Expansion:      Running, LUN X (Y% Complete.)
```

Note: For Fibre Chonnel Arbitroted Loop environments, host port informotion includes:

```
Host Port_1:
  REPORTED PORT_ID YYYYYYYYY-YYYYYYYYY
  PORT_1_TOPOLOGY=L_Port
  Hard Addressing enabled
  LOOP_ID=1, ALPA=0xE8
```

Viewing global settings

The following information can be displayed for the global settings of the controller:

- System name
- Rebuild and expand priority settings
- Read and write cache settings
- Power supply and EMU temperatures

To view information about the global settings of the controller:

Basic command

```
SHOW GLOBALS
```

Example command

```
CLI> SHOW GLOBALS
```

Example CLI response

```
CLI> SHOW GLOBALS

Global Parameters:
  System Name:  ABC
  Rebuild Priority:  high
  Expand Priority:   high

Total Cache:   256MB
  50% Read Cache:  128 MB
  50% Write Cache: 128 MB

Temperature:
  EMU:30 Celsius,86 Farenheit
  PS1:40 Celsius,104 Farenheit
  PS2:40 Celsius,104 Farenheit
```

Viewing version information

The following information can be displayed for the controllers:

- Firmware version
- Hardware revision
- Internal EMU Firmware revision

To view version information about the MSA:

Basic command

```
SHOW VERSION
```

Example command

```
CLI> SHOW VERSION
```

Example CLI response

```
CLI> SHOW VERSION
Firmware version:  4.24 build 122
Hardware revision:  7
Internal EMU Rev:   1.86
```

Viewing connection information

The following command displays the World Wide Names of each Host Bus Adapter (HBA) attached to the MSA. If connections between the HBAs and the MSA have been given user-defined names, these names are also displayed.

Note: Use the SHOW CONNECTIONS command to verify that all connections to the MSA are recognized and defined.

Basic command

```
SHOW CONNECTIONS
```

Example command

```
CLI> SHOW CONNECTIONS
```

Command options

CONNECTION NAME—the name of a specific connection to display.

WWPN—the WWPN of a specific connection to display.

Example CLI response

```
Connection Name: abc
  Host WWNN = 11111111-11111111
  Host WWPN = 22222222-22222222
  Profile Name = Default
  Unit Offset = 0
  Controller 1 Port 1 Status = Online
  Controller 2 Port 1 Status = Online

Connection Name: <unknown>
  Host WWNN = 33333333-33333333
  Host WWPN = 44444444-44444444
  Profile Name = Default
  Unit Offset = 0
  Controller 1 Port 1 Status = Online
  Controller 2 Port 1 Status = Online
```

Viewing complete system information with one command

The CLI provides a single command that will execute the following commands as a batch.

- `show version`
- `show profile`
- `show globals`
- `show acl`
- `show connections`
- `show disks`
- `show units`
- `show this_controller`
- `show other_controller`

Basic command

```
SHOW TECH_SUPPORT
```

Example command

```
CLI> SHOW TECH_SUPPORT
```

The commands will execute using the standard output. For example displays and more information on the separate commands, see the previous pages.

Array controller configuration commands

The CLI provides the ability to configure the MSA1000 controller, including:

- Setting global variables
- Setting the controller ID
- Setting hard addressing
- Changing the CLI prompt

Each of these procedures uses the SET command, which changes the settings of the MSA1000 Controller.

Setting global variables

A single command with a variety of parameters is used to set the expand priority, the read/write ratio, and the system name.

Basic command

```
SET GLOBALS
```

Example command

```
SET GLOBALS EXPAND_PRIORITY=HIGH REBUILD_PRIORITY=HIGH
SYSTEM_NAME="XXX" READ_CACHE=50 WRITE_CACHE=50
```

Command options

EXPAND_PRIORITY=HIGH—the expand priority. Used when expanding an array to set the priority of array expansions in relation to input/output operations. See below for detailed information about these settings.

REBUILD_PRIORITY=HIGH—the rebuild priority. Used when rebuilding an array to set the priority of an array rebuild in relation to input/output operations.

- **Low**—expansion or rebuild takes place only when the array controller is not busy handling normal I/O requests. This setting has minimal effect on normal I/O operations. However, there is an increased risk that data will be lost if another physical drive fails while the rebuild is in progress.
- **Medium**—expansion or rebuild occurs for half of the time, and normal I/O requests are handled during the rest of the time.
- **High**—rebuild or expansion occurs at the expense of normal I/O operations. Although system performance is affected, this setting provides better data protection because the array is vulnerable to additional drive failures for a shorter time.

SYSTEM_NAME="*XXX*"—the system name, where *XXX* represents any user defined phrase, up to 20 alphanumeric characters.

READ_CACHE=50—the read cache. This value must be between 0 and 100.

WRITE_CACHE=50—the write cache. This value must be between 0 and 100

Note: Read_cache plus write_cache must equal 100.

Example CLI response

```
Global Parameters:

System Name:XXX
Rebuild Priority:HIGH
Expand Priority:HIGH

Total Cache:256MB
50% Read Cache:128MB
50% Write Cache:128MB
```

Setting the controller ID

To assign a unique name to each controller installed in the MSA:

Basic command

```
SET THIS_CONTROLLER_ID
SET OTHER_CONTROLLER_ID
```

Example command

```
CLI> SET THIS_CONTROLLER_ID 123
```

Command options

123—the user-defined ID for the controller.

The ID can be up to 230 alphanumeric characters or a decimal number in the range of 0 though 65535. In this example, the controller ID will be changed to 123.

Example CLI response

```
CLI> SET THIS_CONTROLLER_ID 123
Controller identifier 123 created.
```

Setting hard addressing

To enable or disable Fibre Channel Arbitrated Loop hard addressing on an MSA controller:

Basic command

```
SET THIS_CONTROLLER_HARD_ADDRESS
```

Example command

```
CLI> SET THIS_CONTROLLER_HARD_ADDRESS ENABLE 1
```

Command options

ENABLE—enables hard addressing on the controller.

DISABLE—disables hard addressing on the controller.

1—a decimal number between 0 and 125 to assign the loop identifier.

Example CLI response

```
CLI> SET THIS_CONTROLLER_HARD_ADDRESS ENABLE 1
Hard Addressing is enabled.
Loop ID = 1, ALPA = 0xE8
```

Changing the CLI prompt

To temporarily change the CLI prompt from the default of "CLI>":

Basic command

```
SET PROMPT
```

Example command

```
CLI> SET PROMPT ABC
```

Command options

ABC—the user-defined name for the prompt. The name can be up to 24 alphanumeric characters. In this example, the prompt will be changed to ABC.

Example CLI response

```
ABC>
```

LUN management commands

The following commands are used to physically locate the specific hard drives in a LUN as well as create, delete, and modify storage LUNs.

- Flashing LEDs/locating hard drives
- Creating LUNs
- Assigning a name or ID to a LUN
- Adding a spare to a LUN
- Deleting LUNs
- Deleting spares
- Recognizing a failed unit
- Modifying arrays and LUNs

Flashing LEDs/locating hard drives

A variety of commands are available for physically locating specific hard drives. Specifically, you can locate all drives attached to the MSA, all drives in a specific storage enclosure, all drives on a specific SCSI bus, all drives in a specific LUN, or a specific individual hard drive.

When these commands are executed, the LEDs of the requested drives will blink. These LEDs are visible from the front of the MSA and its attached storage enclosures.

Note: If a time limit is not included with the Locate command, the LEDs will blink for 30 seconds.

The basic command verb is LOCATE, but a variety of command nouns and command options are available to customize the request.

Basic command

```
LOCATE
```

Command options

TIME=*xxx*—(optional) the length of time to flash the LEDs, where *xxx* represents the number of seconds.

ALL—all drives connected to the MSA storage sub-system will be flashed.

BOX—the number of the storage enclosure whose disks you want to flash.

1=the MSA drive shelf
2=the storage enclosure attached to SCSI port A
3=the storage enclosure attached to SCSI port B

BUS—the number of the bus whose disks you want to flash.

UNIT—the number of the LUN whose disks you want to flash.

DISKxxx-DISKyyy—a range of drives to flash. Disks are identified by box number and bay number.

DISKzzz—a specific drive to flash. Disks are identified by box number and bay number.

Locating all drives attached to the MSA

To flash the LEDs of all drives attached to the MSA:

Example command

```
CLI> LOCATE ALL
```

Locating all drives in a specific storage enclosure

To flash the LEDs of all drives in the MSA drive shelf or additional storage enclosures:

Example command

```
CLI> LOCATE BOX 3
```

BOX 3—the drives in the storage enclosure attached to SCSI port B will be flashed.

Locating all drives for a specific SCSI bus

To flash the LEDs of all drives connected to a specific SCSI bus:

Example command

```
CLI> LOCATE BUS 1
```

`BUS 1`—all drives connected to bus number 1 will be flashed.

Locating all drives in a specific LUN

To flash the LEDs and locate all drives associated with a specific LUN:

Example command

```
CLI> LOCATE UNIT 1
```

`UNIT 1`—the drives in LUN 1 will be flashed.

`UNIT ALL`—all drives incorporated into LUNs will be flashed.

Locating specific drives

To flash the LEDs to locate an individual drive or group of drives:

Example command

```
CLI> LOCATE DISK DISK102-DISK106
```

`DISK DISK102-DISK106`—the LEDs on drives in bays 2 through 6 in box 1 will blink.

Canceling a LOCATE request

To stop the flashing of the drive LEDs caused by a previous `Locate` command and return the drive LEDs to normal operations:

Example command

```
CLI> LOCATE CANCEL
```

There are no available options for this command.

Creating LUNs

A LUN is a logical storage unit comprised of one or more hard drives.

When a LUN is initially created, the LUN Unit ID is automatically set to the number assigned to the LUN. If desired, this LUN ID name can be changed. See "Assigning a Name or ID to a LUN" for procedural information.

The basic command is `ADD UNIT`. A variety of options are available to modify the command.

Basic command

```
ADD UNIT
```

Command options

`DATA="DISKzzz"`—the number of an individual drive to incorporate into the LUN. Disks are identified by box number and bay number. For example, DISK110 identifies disk 10 in box number 1.

`DATA="DISKxxx-DISKyyy"`—a range of drives is to be incorporated into the LUN. Disks are identified by box number and bay number. For example, DISK101-DISK105 identifies disks 1 through 5 in box number 1.

Note: Quotation marks must be entered both before and after the data disk drives that are to be included in the LUN.

`RAID_LEVEL=`*xxx*—the RAID fault-tolerance level to use, where *xxx* represents:

`0` = RAID 0 (no fault tolerance)
`1` = RAID 1 (mirroring)
`5` = RAID 5 (distributed parity)
`ADG` = Advanced Data Guarding (ADG)

Note: If more than one pair of drives are included in a RAID 1 array, the data is striped across the first half of the drives in the array and then each drive is mirrored to a drive in the remaining half of the drives for fault tolerance. This method is referred to as RAID 1+0.

`STRIPE_SIZE=xxx`—(optional) the stripe size to assign (in KB), where *xxx* represents 8, 16, 32, 64, 128, or 256 Kilobytes.

RAID 0 uses stripe sizes 8, 16, 32, 64, 128, and 256 (Default: 128 KB)
RAID 1 uses stripe sizes 8, 16, 32, 64, 128, and 256 (Default: 128 KB)
RAID 5 uses stripe sizes 8, 16, 32, and 64 (Default: 16 KB)
RAID ADG uses stripe sizes 8, 16, 32, and 64 (Default: 16 KB)

`SIZE=xxxxyy`—(optional) how much of the available space on the indicated drives is to be used for the LUN, where *xxxx* represents the LUN size and *yy* indicates MB or GB. (When GB is entered, all return displays will be converted to MB.) If no size is specified, the maximum available space of the included disks will be assigned to the unit. See "Creating Multiple LUNs on a Group of Drives" for an example of using the `Size` command option.

`SPARE=DISKxxx`—(optional) disk(s) to assign as a spare to the unit, where *xxx* represents the disk number. More than one disk can be assigned as a spare to a LUN.

`MAXBOOT=ENABLE/DISABLE`—(optional) changes the size of the boot partition.

`Enable` = 8-GB boot partition (default)
`Disable` = 4-GB boot partition

`CACHE=ENABLE/DISABLE`—(optional) determines whether to use the array controller cache for the LUN.

`Enable` = (default) use the array controller cache
`Disable` = not use the array controller cache

Creating a single LUN from a group of drives

To create one LUN from an individual drive or group of drives:

Example command

```
CLI> ADD UNIT 0 DATA="DISK101-DISK107 DISK110" RAID_LEVEL=ADG
STRIPE_SIZE=64
```

Note: Maintain a record of the units as they are created. These Unit ID numbers are used in other CLI commands. In addition to recording the unit number, the drives included, RAID type and size, *record the order in which they are created.*

Command options

`0`—LUN 0 is to be created.

`DATA="DISK101-DISK107 DISK110"`—drives 1 through 7 and disk 10 in box number 1 are to incorporated into the LUN.

`RAID_LEVEL=ADG`—RAID level ADG will be used when creating LUN 0.

`STRIPE_SIZE=64`—stripe size of 64 will be used when creating LUN 0.

Example CLI response

```
First volume to be configured on these drives.
Logical Unit size = 69460 MB
RAID overhead = 0 MB
Total space occupied by new unit = 69460 MB
Free space left on this volume = 0 MB
Unit 0 is created successfully.
```

Creating Multiple LUNs on a group of drives

To carve out multiple LUNs from a drive or group of drives, use the `ADD UNIT` command and include the `SIZE=` command option. Repeat the command using a unique LUN ID for each LUN, along with the desired size parameter.

Example command

```
CLI> ADD UNIT 1 DATA="DISK111-DISK114" RAID_LEVEL=5
STRIPE_SIZE=32 SIZE=1000MB
```

Note: Mointoin o record of the units os they ore creoted. These Unit ID numbers ore used in other CLI commonds. In oddition to recording the unit number, the drives included, RAID type ond size, ond *record the order in which they are created.*

Command options

`1`—LUN 1 is to be created.

`DATA="DISK111-DISK114"`—drives 11 through 14 in box number 1 to the LUN.

`RAID_LEVEL=5`—RAID 5 will be used when creating the LUN.

`STRIPE_SIZE=32`—stripe size of 32 will be used when creating the LUN.

`SIZE=1000MB`—1000 MB of the available space will be used for the LUN.

Example CLI response

The following display is a continuation of the previous example, creating three LUNs on the same group of physical drives.

```
CLI> ADD UNIT 1 DATA="DISK111-DISK114" RAID_LEVEL=5
STRIPE_SIZE=32 SIZE=1000MB
First volume to be configured on these drives.
The logical unit size has been adjusted by 4MB for optimal
performance.
Logical Unit size = 996 MB
RAID overhead = 498 MB
Total space occupied by new unit = 1494 MB
Free space left on this volume = 24533 MB
Unit 1 is created successfully.

CLI> ADD UNIT 2 DATA="DISK111-DISK114" RAID_LEVEL=5
STRIPE_SIZE=32 SIZE=2000MB
Logical Unit size = 2000 MB
RAID overhead = 1000 MB
Total space occupied by new unit = 3000 MB
Free space left on this volume = 21533 MB
Unit 2 is created successfully.

CLI> ADD UNIT 3 DATA="DISK111-DISK114" RAID_LEVEL=5
STRIPE_SIZE=16 SIZE=4000MB
Logical Unit size = 4000 MB
RAID overhead = 2000 MB
Total space occupied by new unit = 6000 MB
Free space left on this volume = 15533 MB
Unit 3 is created successfully.
```

Creating a LUN with an assigned spare

To create a LUN and assign a spare at the same time, use the `ADD UNIT` command and include the `SPARE=` command option.

Note: More than one spare can be assigned to the same LUN and the same spare can be available to multiple LUNs.

Example command

```
CLI> ADD UNIT 4 DATA="DISK211-DISK212" RAID_LEVEL=1
SPARE="DISK213"
```

Note: Maintain a record of the units as they are created. These Unit ID numbers are used in other CLI commands. In addition to recording the unit number, the drives included, RAID type and size, and record *the order in which they are created.*

Command options

`4`—LUN 4 is to be created.

`DATA="DISK211-DISK212"`—drives 11 through 12 in box number 2 are to be incorporated into the LUN.

`RAID_LEVEL=1`—RAID 1 will be used when creating the LUN.

`SPARE="DISK213"`—the drive in bay 13 of box 2 will be assigned as a spare drive to the LUN.

Note: Quotation marks must be entered both before and after the disk drive that is to be designated as a spare for the LUN.

Example CLI response

```
First volume to be configured on these drives.
Logical Unit size = 69460 MB
RAID overhead = 69460 MB
Total space occupied by new unit = 138920 MB
Free space left on this volume = 0 MB
Unit 4 is created successfully.
```

Assigning a name or ID to a LUN

If desired (or required by your operating system), each LUN can be assigned a unique name or ID in addition to its number. These user-defined names make it easier to identify specific LUNs in other configuration procedures.

Note: OpenVMS systems require each LUN to have a unique ID. No two devices in the entire SAN for this OpenVMS system may share ID numbers. LUNs in different storage systems must have different IDs.

Basic command

```
SET UNIT_ID
```

Example command

```
CLI> SET UNIT_ID 0 ABC
```

Command options

0–LUN 0 is being assigned a name.

ABC—is the name to assign to LUN 0. The name of this LUN will be ABC.

Example CLI response

```
Identifier "ABC" created for unit 0
```

Adding a spare to a LUN

To add a spare to an existing LUN:

Basic command

```
ADD SPARE
```

Example command

```
CLI> ADD SPARE UNIT=2 DISK109
```

Command options

UNIT=2—the unit to assign the spare to. This is the same number that was given to the unit when it was created with the ADD UNIT command. In this example, LUN 2 will have use of the spare.

DISK109—indicates the drives to assign as the spare to the LUN. Disks are identified by box number and bay number. In this example, drive 9 in box number 1 is to be used.

Example CLI response

```
First volume to be configured on these drives.
Logical Unit size = 69460 MB
RAID overhead = 69460 MB
Total space occupied by new unit = 138920 MB
Unit 2 is created successfully.
```

Deleting LUNs

To delete the last created LUN:

Note: If more than one LUN has been created, only the last LUN created can be deleted. It is important to maintain a record of the unit numbers and the order in which they are created.

Note: After a LUN is deleted, its unit number goes unused until manually assigned to a new LUN. Unit numbers are not automatically reassigned when a LUN is deleted.

Basic command

```
DELETE UNIT
```

Example command

```
CLI> DELETE UNIT 4
```

Command options

4—the unit to delete. This is the same number that was given to the unit when it was created with the ADD UNIT command. In this example, LUN 4 is to be deleted.

Example CLI response

```
Data will be lost after the unit is deleted.
Do you still want to DELETE unit 4 (Y/N)? Y
Please wait while unit 4 is being deleted…
Unit 4 is deleted successfully.
```

Deleting spares

To remove a spare from use:

Basic command

```
DELETE SPARE
```

Example command

```
CLI> DELETE SPARE UNIT=2 DISK109
```

Command options

UNIT 2—the unit that will no longer have access to the spare. This is the same number that was given to the unit when it was created with the ADD UNIT command. In this example, LUN 2 will no longer have access to the spare.

DISK109—the spare drive to remove from use. Disks are identified by box number and bay number. In this example, drive 1 in box number 9 will no longer be used as a spare for LUN 2.

Recognizing a failed unit

If all drives of a previously failed unit are in working order, use this command to change the state of the unit back to VOLUME_OK.

To accept media exchange on a unit marked as failed:

Basic command

```
ACCEPT UNIT
ACCEPT UNITS
```

Example command

```
CLI> ACCEPT UNIT 2
```

Command options

#—the unit that you want to activate, where # represents the unit number.

If a unit number is not specified, all units will be reset.

Modifying arrays and LUNs

Occasionally, after an array or a LUN has been created, its characteristics need to be changed. The following changes can be made:

- Adding drives to an array
- Adding space to a LUN
- Changing the RAID characteristics of a LUN
- Changing attributes of a LUN

Each task is discussed in the following paragraphs.

Adding drives to an array

To add additional physical drives to an array:

Note: Because this command affects the entire array, all LUNs made from the array are also affected.

Basic command

```
EXPAND UNIT
```

Example command

```
CLI> EXPAND UNIT 4 DISK204-DISK207
```

Command options

4—one of the LUN within the target array.

Note: Any LUN in the array can be entered to identify the array; the space is added to the array and not the LUN.

DISK204-DISK207—the physical disks to add to the array. Disks are identified by box number and bay number. In this example, DISK204-DISK207 identifies disks 4 through 7 in box number 2.

Example CLI response

```
The actual new array capacity will be 3000MB.
The array with Unit 4 is being expanded.
Use "show unit 4" to monitor progress.
```

Adding space to a LUN

To add unused, available space in an array to a specific LUN:

Basic command

```
EXTEND UNIT
```

Example command

```
CLI> EXTEND UNIT 2 ADD_SIZE=1000MB
```

Command options

2—the LUN to which the space will be added. In this example, LUN 2 is being extended.

ADD_SIZE=1000MB—how much of the available space in the array to add to the LUN. In this example, 1000 MB of space will be added. The size limit must be specified as GB, MB, or KB. If no size is specified, the maximum available space of the included disks will be assigned to the array.

NEW_SIZE=*xxxxyy*—can be used instead of ADD_SIZE to enter the total new size of the LUN, where *xxxx* represents the size and *yy* indicates GB, MB, or KB.

Example CLI response

```
The actual new volume size will be 1992MB.
Unit 2 is being extended.
Use "show unit 2" to monitor progress.
```

Changing the RAID characteristics of a LUN

While obeying the constraints of included number of drives and applicable stripe sizes, you can migrate an array from one RAID level to another. If you attempt to move to an unsupported RAID configuration for an array, an error message is displayed.

To change the RAID level or the stripe size of a LUN:

Note: Before changing the RAID level ar stripe size af a LUN, verify there is available, unused space an the array. Migrating fram ane RAID level ta anather may require additianal space far parity and arganizatianal purposes.

Basic command

```
MIGRATE UNIT
```

Example command

```
CLI> MIGRATE UNIT 0 RAID_LEVEL=5 STRIPE_SIZE=32
```

Command options

`UNIT 0`—the number of the LUN to modify. In this example, LUN 0 will be migrated.

`RAID_LEVEL=xxx`—RAID 5 will be assigned to the LUN.
RAID levels include:

`0` = RAID 0 (no fault tolerance)
`1` = RAID 1 (mirroring)
`5` = RAID 5 (distributed parity)
`ADG` = Advanced Data Guarding (ADG)

`STRIPE_SIZE=xxx`—(optional) the stripe size of 32 will be used. Other stripe size options include:

`RAID 0` uses stripe sizes 8, 16, 32, 64, 128, and 256 (Default: 128 KB)
`RAID 1` uses stripe sizes 8, 16, 32, 64, 128, and 256 (Default: 128 KB)
`RAID 5` uses stripe sizes 8, 16, 32, and 64 (Default: 16KB)
`RAID ADG` uses stripe sizes 8, 16, 32, and 64 (Default: 16 KB)

Example CLI response

```
The RAID level of Unit 0 will now be 5.
Unit 0 is being migrated.
Use "show unit 0" to monitor progress.
```

Changing attributes of a LUN

To enable or disable the array accelerator cache for a specific LUN:

Basic command

```
SET UNIT
```

Example command

```
CLI> SET UNIT 0 CACHE=DISABLE
```

Command options

UNIT 0—the number of the LUN to modify. In this example, LUN 0 will be modified.

CACHE=ENABLE or DISABLE—either enables or disables the use of the array accelerator cache for the specified LUN.

Example CLI response

```
CLI> SET UNIT 0 CACHE=ENABLE
Cache for unit 0 has been enabled.

CLI> SET UNIT 1 CACHE=DISABLE
Cache for unit 1 has been disabled.
```

Server connection commands

Each time the MSA is powered on, all active HBA connections to the MSA are automatically detected and identified by their WWPN.

Before a server accesses the storage of the MSA, you must identify the operating system (host mode) of each connection. HP also recommends assigning a user-defined name to each connection, to make the identification and setup of each connection easier.

After connections are established, be sure to restrict access to the LUNs to specific servers. The CLI uses an Access Control List (ACL) to enter the list of LUNs a server can access. See the following section "Access control list commands" for more information about SSP and ACLs.

Each of the following commands is used to enter and manage the connections:

- Naming a connection
- Setting the connection profile
- Changing the name of a connection
- Changing the HBA of a connection
- Deleting a connection name

Note: Use the `SHOW CONNECTIONS` command to display information about each HBA connected to the MSA, including connection name, WWPN, and profile.

The connection name and the WWPN are used when entering connection information.

See "Viewing connection information" on page 30 for details.

Naming a connection

This command is used to name the association between the Fibre Channel Initiator (HBA in the server) and the MSA, while at the same time identifying the operating system (connection profile) of the server. The name given to a connection is user defined, according to a naming convention that makes identification and setup of the ACL for each connection easier.

Note: If the server is not yet connected to the MSA, but WWPN of the HBA is known, you can use this command to manually add, name, and identify the connection.

Basic command

```
ADD CONNECTION
```

Example command

```
CLI> ADD CONNECTION ABC WWPN=12345678-12345678 PROFILE=WINDOWS
```

Command options

ABC—the user-defined name to give the connection.

WWPN=12345678-12345678—the WWPN of the active HBA inside the server attached to the MSA. The `show connections` command can be used to obtain the WWPN.

WWNN—the WWNN of the active HBA inside the server attached to the MSA. The `show connections` command can be used to obtain the WWNN.

PROFILE=WINDOWS—the platform of the host. If a profile is not specified, the default profile is used.

Profile options include:

`Windows` (default)
`OpenVMS`
`Tru64`
`Linux`
`Solaris`
`Netware`
`HP`

OFFSET=X—(default: 0) the unit offset for assigning logical volumes.

Example CLI response

```
Connection has been added successfully.
Profile Windows is set for the new connection.
```

Setting the connection profile

To change the operating-system profile associated with an existing connection:

Note: The connection profile is sometimes referred to as the Host Mode.

Basic command

```
SET CONNECTION X PROFILE=Y
```

Example command

```
CLI> SET CONNECTION ABC PROFILE=WINDOWS
```

Command options

ABC—the name of the connection to modify, in this example ABC.

WWPN=12345678-12345678—the WWPN of the connection to modify, using the WWPN of the HBA. The "show connections" can be used to obtain the WWPN.

WWNN=12345678-12345678—the WWNN of the connection to modify, using the WWNN of the HBA. The "show connections" command can be used to obtain the WWNN.

PROFILE=WINDOWS—the platform of the host, which in this example is Windows. See "Naming a connection" for a list of profile types.

Example CLI response

```
The Profile of Connection ABC is set to Windows successfully.
```

Changing the name of a connection

To change the name associated with a connection:

Basic command

```
RENAME CONNECTION
```

Example command

```
CLI> RENAME CONNECTION ABC XYZ
```

Command options

ABC—the current name of the connection that is to be changed.

XYZ—the new name to assign to the connection, up to 16 alphanumeric characters.

Example CLI response

```
Connection(s) has been renamed successfully.
```

Changing the HBA of a connection

When a new HBA needs to be associated with an existing connection name:

Basic command

```
SET CONNECTION
```

Example command

```
CLI> SET CONNECTION ABC WWPN=12345678-Y999999Y
```

Command options

ABC—the connection to make the changes to.

WWPN=12345678-12345678—the World Wide Port Name (WWPN) of the new HBA to associate with the connection.

WWNN=12345678-12345678—the World Wide Node Name (WWNN) of the new HBA to associate with the connection.

Example CLI response

```
Connection(s) has been set successfully.
The WWPN of connection ABC is set to 12345678-Y999999Y
successfully.
```

Deleting a connection name

To remove the name associated with a connection to a server:

Basic command

```
DELETE CONNECTION
```

Example command

```
CLI> DELETE CONNECTION ABC
```

Command options

ABC—the nickname that was assigned to the HBA within the server.

Example CLI response

```
Connection(s) has been deleted successfully.
```

Access control list commands

When multiple servers access the storage of the MSA, it becomes necessary to restrict access to LUNS to specific servers. The CLI uses an Access Control List (ACL) to enter the list of LUNs a server can access.

Each of the following commands is used to set up and manage the ACL:

- Viewing the ACL
- Adding to the ACL
- Deleting Information from the ACL
- Disabling the ACL

Each of these tasks is defined in the following sections.

Note: Use the `SHOW CONNECTIONS` commond to display the connection nome ond the WWPN of eoch HBA connected to the MSA.

The connection nome or the WWPN is used when entering ACL informotion.

See "Viewing connection informotion" on poge 30 for detoils obout this commond.

Viewing the ACL

To display the current ACL:

Basic command

```
SHOW ACL
```

Command options

There are no available options for this command.

Example CLI response

```
ACL is enabled:
Connection      WWPN                  Units
ABC             11111111-22222222     0,1,2
XYZ             33333333-44444444     2,3,4
Inaccessible Units: 5,6
```

Adding to the ACL

To indicate the allowable LUNs for each server:

Basic command

```
ADD ACL
```

Command options

CONNECTION=*xxx*—the name of the connection to grant access, where *xxx* represents the connection name.

UNIT=*xxx*—which LUN to assign to the indicated server.

Options include:

An individual LUN can be assigned by entering one LUN ID (UNIT=0)
A group of LUN can be assigned by entering a range of LUN (UNIT=1-3)
Access to all units can be granted by entering UNIT=ALL.

Two methods of entering LUN assignments are available:

- Adding to the ACL using the connection name
- Adding to the ACL using the WWPN

Note: There is no command to activate the ACL. After the first entry is added to the ACL, access to the storage is limited to the servers and LUNs listed in the ACL.

Adding to the ACL using the connection name

Example command

```
CLI> ADD ACL CONNECTION=ABC UNIT=ALL
```

Command options

CONNECTION=ABC—entries will be added to the ACL of the connection named ABC.

UNIT=ALL—all LUN will be accessible to the connection named ABC.

Example CLI response

```
Allowing 12345678-12345678 access to unit 2.
```

Adding to the ACL using the WWPN

Example command

```
CLI> ADD ACL WWPN=12345678-12345678 UNIT=2
```

Command options

WWPN=12345678-12345678—entries will be added to the ACL of the connection with a WWPN of 12345678-12345678.

UNIT=2—LUN 2 will be accessible to the named connection.

Example CLI response

```
Allowing 12345678-12345678 access to unit 2.
```

Deleting Information from the ACL

After the ACL has been set up, access permissions for certain LUNs may need to be removed.

Basic command

```
DELETE ACL
```

Command options

CONNECTION=*xxx*—the name of the connection for which to remove permissions.

UNIT=*xxx*—which LUNs to remove from the ACL of the indicated server.

Two methods of removing access to previously assigned LUNs are available:

- Deleting information from the ACL using the connection name
- Deleting information from the ACL using the WWPN

Note: If all entries in the ACL are being deleted, immediately after the last entry is deleted, all connected servers have unlimited access to the storage.

Deleting information from the ACL using the connection name

Example command

```
CLI> DELETE ACL CONNECTION=ABC UNIT 0
```

Command options used

CONNECTION=ABC—entries will be deleted from the ACL of the connection named ABC.

UNIT=0—LUN 0 is to be deleted from the ACL of the named connection.

Example CLI response

```
Disallowing 12345678-12345678 access to unit 0.
```

Deleting information from the ACL using the WWPN

Example command

```
CLI> DELETE ACL WWPN=12345678-12345678 UNIT=1
```

Command options

`WWPN=12345678-12345678`—entries will be deleted from the ACL of the connection with a WWPN of 12345678-12345678.

`UNIT=1`—LUN 1 will be removed from the ACL of the named connection.

Example CLI response

```
Disallowing 12345678-12345678 access to unit 1.
```

Disabling the ACL

If the ACL has been set up, but the decision has been to not use it and not limit access to the storage, the entries in the ACL need to be deleted. Use the following command to delete all entries in the ACL.

Basic command

```
SET ACL DISABLE
```

Example CLI response

```
Disabling acl
```

Note: When this command is used, all existing ACL entries are automatically deleted. All storage is immediately available to all connected servers.

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